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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/562,798	12/29/2005	Toru Maeda	070456-0098	8704

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EXAMINER	
HARRIS, GARY D	

ART UNIT	PAPER NUMBER
1785	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/562,798	MAEDA ET AL.	
	Examiner	Art Unit	
	GARY D. HARRIS	1785	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 August 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-9 and 11-16* is/are pending in the application.

4a) Of the above claim(s) *8 and 16* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 3-7 & 11-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 08/19/2010 has been entered.

Claim Rejections - 35 USC § 102 / 35 USC § 103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 4, 6, 9 & 12 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Watson et al. ("Synthesis of a novel magnetic photocatalyst by direct deposition of nanosized TiO2 crystals onto a magnetic core", Journal of Photochemistry and Photobiology A: Chemistry, Vol. 148, 303-313, 2005.5.31).

As to Claim 1, Watson discloses a soft magnetic material (iron oxide core using sol-gel process similar to applicants) (Page 304, (Col. 1, Paragraph 3) with a plurality of composite magnetic particles (Page 310, column 2 coated particles). Each composite magnetic particle has a metal magnetic particle of iron (Fe3O4 as the seed particle) (Page 310, column 1). On the iron, a lower film surrounding a surface of said metal magnetic particle is formed of an oxide of a nonferrous metal (Page 310, Col. 2, the lower film is (SiO_2). The lower film (SiO_2) satisfies a composition range that oxygen is less than oxygen of a stoichiometric composition of a compound (Fe2O3) and constitutes an element and oxygen as the lower film (SiO_2) (Page 305, Col. 1). This is because both applicant and Watson are using the same structure ($Fe_2O_3/SiO_2/TiO_2$) and similar process (sol-gel) and would therefore possess the same compositional and stoichiometric range of oxygen (see MPEP 2112). The insulating upper film surrounds the lower film and includes oxygen (TiO_2) (Page 308, Table 4). The nonferrous metals used include silicon and titanium (Page 306, Col. 2).

The absolute value of heat generated when a primary compound is produced (Fe_2O_3) by a reaction between oxygen and said one of silicon (Si) and titanium (Ti) is

greater than an absolute value of heat generated when a primary compound is produced by a reaction between iron and oxygen. As disclosed by applicant, the heat generated is based on material. Since the materials ($Fe_2O_3/SiO_2/TiO_2$) and process (sol-gel) taught in the reference are the same as those disclosed, the structure would inherently have equivalent absolute values of heats of formation. See MPEP 2112.

Watson is silent to the nonferrous metal being an amorphous metal.

However, given the metal is a silica dioxide coating prepared using the sol-gel process (Page 304, Col. 2, Paragraph 2.1.1) and is similar to the process used in applicant's specification; the silica dioxide would be an amorphous metal. The silica dioxide coating is used to encapsulate the magnetic particle and ensure the stability of the particle against dissolution under radiation (Page 304, Col. 2, Paragraph 2.1).

Alternatively, it would have been obvious to use a silica dioxide amorphous metal to encapsulate the magnetic particle and ensure the stability of the particle against dissolution under radiation.

As to Claim 4, Watson discloses the soft magnetic material with an upper film made from a titanium compound (Page 304, Col. 1).

As to Claim 6, Watson is silent to the dust core fabricated using the material in claim one. However, the material would inherently function as a dust core in an equivalent manner as the material claimed. Further, the limitation(s) "a dust core fabricated", the Examiner notes that limitation is a preamble limitation which does not

set forth any structure, but merely state(s) the purpose or intended use of the invention. As stated in the MPEP, "if the body of a claim fully and intrinsically sets forth all of the limitations of the claimed invention, and the preamble merely states, for example, the purpose or intended use of the invention, rather than any distinct definition of any of the claimed invention's limitations, *then the preamble is not considered a limitation and is of no significance to claim construction*. (See MPEP 2111.02). In the instant case, a dust core would be an intended use preamble limitation.

As to Claim 9, Watson discloses a soft magnetic material (iron oxide core using sol-gel process similar to applicants) (Page 304, (Col. 1, Paragraph 3) with a plurality of composite magnetic particles (Page 310, column 2 coated particles). Each magnetic particle has a metal magnetic particle of iron (Fe_3O_4 as the seed particle) (Page 310, column 1). On the iron, a lower film surrounding a surface of said metal magnetic particle and being formed of an oxide of a nonferrous metal (Page 310, Col. 2, the lower film is (SiO_2). The lower film (SiO_2) satisfies a composition range where oxygen is less than oxygen of a stoichiometric composition of a compound (Fe_2O_3) and constitute an element and oxygen as the lower film (SiO_2) (Page 305, Col. 1). This is because both applicant and Watson are using the same structure ($Fe_20_3/SiO_2/TiO_2$) and similar process (sol-gel) and would possess the same compositional and stoichiometric ranges of oxygen (see MPEP 2112). The insulating upper film surrounds the lower film and includes oxygen (TiO_2) (Page 308, Table 4). The nonferrous metals used include silicon and titanium (Page 306, Col. 2). With regard to the diffusion coefficient with

respect to the oxygen included in said upper film that is smaller than the diffusion coefficient of iron, since the materials ($Fe_2O_3/SiO_2/TiO_2$) and process (sol-gel) taught in the reference are the same as those disclosed, the structure would inherently have similar diffusion coefficients. See MPEP 2112.

Watson is silent to the nonferrous metal being an amorphous metal.

However, given the metal is a silica dioxide coating prepared using the sol-gel process (Page 304, Col. 2, Paragraph 2.1.1) and is similar to the process used in applicant's specification; the silica dioxide would be an amorphous metal. The silica dioxide coating is used to encapsulate the magnetic particle and ensure the stability of the particle against dissolution under radiation (Page 304, Col. 2, Paragraph 2.1).

Alternatively, it would have been obvious to use a silica dioxide amorphous metal to encapsulate the magnetic particle and ensure the stability of the particle against dissolution under radiation. Additionally, absent a specific showing, it would be obvious to use an amorphous silica dioxide metal.

As to Claim 12, Watson discloses the soft magnetic where the upper film includes a silicon compound, and a titanium compound (See Page 304, Column 2)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 3, 5, 11 & 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watson et al. ("Synthesis of a novel magnetic photocatalyst by direct deposition of nanosized TiO2 crystals onto a magnetic core", Journal of Photochemistry and Photobiology A: Chemistry, Vol. 148, 303-313, 2005.5.31)

As to Claim 3, 5, 11 & 13, Watson discloses the soft magnetic material has a controllable outer layer thickness with the ultimate aim to tailor desired characteristics such as tailor the photocatalytic performance (Page 308) into the final coated particle and uniformity of coating (Page 303, Col. 2).

Watson is silent to the lower film has an average thickness of not less than 50 nm and not more than 1 micron.

However, it would have been obvious to one skilled in the art to change the thickness of the lower film in order to tailor the photocatalytic performance (Page 308) into the final product (Page 303, Column 2).

One would have been motivated to adjust the thickness of the lower film in order to allow for uniformity of the coated particle SiO_2 layer to allow adhesion of the TiO_2 layer. One of ordinary skill would have adjusted the thickness based on magnetic interaction between the particles as the thickness of the coatings increase the magnetic interaction will decrease between particles.

Claim 7, 14 & 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watson et al. ("Synthesis of a novel magnetic photocatalyst by direct deposition of nanosized TiO2 crystals onto a magnetic core", Journal of Photochemistry and Photobiology A: Chemistry, Vol. 148, 303-313, 2005.5.31) and further in view of Ueta et al. 2004/0126609.

As to Claim 7, 14 & 15, Watson is silent with regard to a dust core having an organic matter disposed between said plurality of composite magnetic particles to join said plurality of composite magnetic particles together and including at least one selected from the group consisting of a polyethylene resin, a silicone resin, a polyamide resin, a polyimide resin, a polyamide imide resin, an epoxy resin, a phenolic resin, an acrylic resin and a polytetrafluoroethylene.

Ueta et al. 2004/0126609 discloses a metal powder for powder for providing magnetic cores (similar to applicant see abstract) using polymeric resistant films and organic substances such as epoxy resin, phenolic resin, silicone resin, amide resin, (Paragraph 108) and discloses the use of polyamide (see table 1) (Paragraph 134-135). Ueta '609 teaches molding the particles together (Paragraph 0119 & 0120) and are used in various applications because of there compressibility of the coated powder onto the magnetic core (Paragraph 0111). Since a dust core is made by mixing powdered magnetic material with an insulative binder the magnetic core is a dust core.

It would have been obvious to one skilled in the art to use a dust core (magnetic core), having an organic matter disposed between said pluralities of composite magnetic particles of Watson in order to provide a method of molding the particles together as taught in Ueta. One would have been motivated to add the Ueta polymeric and silicone materials in Watson in order to provide compressibility and allow molding of the magnetic material. One of ordinary skill would have recognized that a magnetic powder with a polymer or silicone would produce a moldable material and be molded into a dust core.

Response to Arguments

Applicant's arguments filed 08/19/2010 (*in italics*) are addressed as follows:

Claims 1, 4, 6, 9 and 12 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Watson et al. ("Synthesis of a novel magnetic photocatalyst by direct deposition of nanosized TiO2 crystals onto a magnetic core). Claims 3, 5, 11 and 13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Watson; and claims 7, 14 and 15 as being unpatentable over Watson in view of Ueta et al. (US 2004/0126609). Applicants respectfully traverse these rejections for at least the following reasons.

With regard to the present disclosure, amended independent claims 1 and 9 each recite, in part, a soft magnetic material comprising a lower film surrounding a surface of said metal magnetic particle and being formed of an oxide of a nonferrous metal satisfying a composition range where oxygen is less than oxygen of a stoichiometry composition of a compound constituted of an element and oxygen, that constitute the lower film; and an insulating upper film surrounding a surface of said lower film and including oxygen, wherein said nonferrous metal includes at least one amorphous metal selected from the group consisting of aluminum, chromium, and silicon.

One feature of the present claims is that the nonferrous metal is amorphous, and is selected from the group consisting of aluminum, chromium, and silicon.

It was alleged that Watson discloses a soft magnetic material composition of claims 1 and 9. However, claims 1 and 9 have been amended, as suggested by the Examiner, to only include aluminum, chromium and silicon as components. In contrast, Watson merely comprises titanium. Additionally, the titanium of Watson is not amorphous. Accordingly, Watson fails to teach or suggest all of the limitations of amended independent claims 1 and 9 of the present disclosure. Moreover, Ueta does not, and is not relied upon to remedy this deficiency.

Anticipation under 35 U.S.C. § 102 requires that each element of the claim in issue be found, either expressly described or under principles of inherency, in a single prior art reference, Kalman v. Kimberly-Clark Corp., 713 F.2d 760, 218 USPQ 781 (Fed. Cir. 1983). At a minimum, Watson fails to disclose the limitations of independent claims 1 and 9 for the reasons set forth above. Accordingly, claims 1 and 9 are allowable and patentable over the cited prior art. Reconsideration and withdrawal of the rejection of claims 1 and 9 is respectfully solicited.

Applicant argues that the amended claims selected from the group consisting of aluminum, chromium and silicon overcomes the art of record. However, Watson teaches silicon as the lower layer. There is no restriction on titanium as the outer layer. Applicant additionally argues that Watson does not disclose an amorphous material. However, Watson discloses the TiO2 particles are amorphous hydroxides and hydrous oxides (Page 311, Col. 1, 1st Paragraph). The silica dioxide coated magnetic particles are prepared by the sol-gel process similar to applicant's disclosure. It would have been obvious to use a silica dioxide amorphous metal to encapsulate the magnetic particle and ensure the stability of the particle against dissolution under radiation. Additionally, absent a specific showing, it would be obvious to use an amorphous silica dioxide metal.

Pertinent Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kobayshi Kunpei et al. JP 07-179982 teaches a soft magnetic sintered alloy having an oxide of a metal with an affinity for oxygen higher than that of iron (see abstract). The metals with greater affinity than iron are disclosed as aluminum, silicon, chromium and may contain --one sort -- or two or more sorts can be used (layers) [0008]. Enveloping layers are formed above the iron particle ([0010] & throughout specification).

Edo et al. JP 2005-085967 teaches a coated particle with two coating layers. The middle layer can be Cr and it has some oxygen diffused into the layer. There is an outer ferrite layer. The reference is silent to being amorphous, but absent a specific showing, it would be obvious to use crystalline or amorphous materials. The ferrite layer diffuses oxygen to the magnetic particle and the coating film (32, Cr) suppresses the diffusion by absorbing the oxygen (see abstract).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GARY D. HARRIS whose telephone number is (571)272-6508. The examiner can normally be reached on 8AM - 5PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Ruthkosky can be reached on 571-272-1291. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark Ruthkosky/
Supervisory Patent Examiner, Art Unit 1785

/G. D. H./Gary Harris
Examiner, Art Unit 1785